EXHIBIT "B"

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/037,801	03/10/98	LAFOLLETTE	R 7310

IM22/0220

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EXAMINER	
ALEJANDRO, R	
ART UNIT	PAPER NUMBER
1745	26

DATE MAILED: 02/20/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.	App[illegible]
09/037,801	Lafollete et al.
Examiner	**Group Art Unit**
Raymond Alejandro	1745

☒ Responsive to communication(s) filed on *1/11/01*

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *10-43, 51-54, 89-92, 94-97, and 103-109* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *10-43, 51-54, 89-92, 94-97, and 103-109* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 01/11/01 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/037801 is acceptable and a CPA has been established. An action on the CPA follows.

Specification

2. The amendment filed 01/11/01 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: (claims 10, 33, 41-43, 51, 89 and 94-95) "the footprint substantially less/smaller than 20 cm^2" (footprint area); (claims 10, 21, 41-43) "the size-congruent" limitation. As to the footprint size, it is noted that specification (page 15, lines 1-7) clearly encompasses "batteries with a very tiny footprint (area), on the order of 0.1 cm^2 down to 0.0001 cm^2". *Thus, the footprint area as instantly claimed is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor originally had possession of the claimed invention.* As far as the "congruent-size", it is noted that this terminology has not been disclosed throughout the specification.

Applicant is required to cancel the new matter in the reply to this Office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 10-43, 51-54, 89-92, 94-97 and 103-109 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: (claims 10, 33, 41-43, 51, 89 and 94-95) "the footprint substantially less/smaller than 20 cm^2" (footprint area); (claims 10, 21, 41-43) "the size-congruent" limitation. As to the footprint size, it is noted that specification (page 15, lines 1-7) clearly encompasses "batteries with a very tiny footprint (area), on the order of 0.1 cm^2 down to 0.0001 cm^2". *Thus, the footprint area as instantly claimed is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor originally had possession of the claimed invention.* As far as the "congruent-size", it is noted that this terminology has not been disclosed throughout the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 42-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The term "suitable" in claims 42 (line 4) and 43 (line 4) is a relative term which renders the claim indefinite. The term "suitable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 10-12, 15-43, 51-54, 89-92, 94-97 and 103-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arledge et al 5437941.

The instant claims are drawn to a microscopic rechargeable battery wherein the alleged inventive concept comprises the microscopic structures. Other limitations include the thin film, the non-conductive base, the materials, the electrolyte influent flow path, the etched cavity and the separators.

Arledge et al disclose an energy storage device having an electrode consisting of a thin film of metal or metal oxide *deposited on a substrate*. Spherical plastic spacers are uniformly dispersed on the electrode at a maximum density of about 1000 spacers per square millimeter of

the electrode area. A second substrate also has an electrode formed on it, similar to the first substrate (abstract/ col 2, lines 9-33). The first and second substrate are arranged so that the electrodes face each other and are separated by the spherical plastic spacers to form a gap of about 20 microns between electrodes. An electrolyte is filled in the gap. The device may also be formed by using *metal foils*, and eliminating one or more of the substrates. The use of an electrolyte is optional (abstract/ col 2, lines 9-33). It is related to electrical energy storage devices such as electrochemical cells (col 1, lines 9-10/ col 5, lines 35-44). *The total area of the plane between the two electrodes in the cell is approximately 20 square centimeters* (col 5, lines 3-6).

Arledge et al disclose that the substrate could be nonconductive but in the case where the substrate is conductive it could also function as a current collector. A thin film of electrode material would be applied to the face of a substrate. The electrode material would be applied to the substrate using standard deposition techniques such as sputtering, evaporation, lamination, plating, chemical vapor deposition or plasma spraying (col 2, lines 34-51).

Arledge et al teach the electrodes are between 0 to about 10,000 Angstroms thick. This is the range of coating thickness that is known to those skilled in the art as a thin film. For example, hybrid microelectronic circuits are made in the range of 100-15,000 Angstroms. However, in some instances the user may wish to deposit a somewhat heavier film of metal or metal oxide, and films up to about 30,000 Angstroms, most preferentially, the film will be between 1000 and 3000 Angstroms thick. ***The electrode may be patterned by a number of conventional means, including etching*** (col 2, line 52 to col 3, line 2). Examples 1 and 2 illustrate two small

sheets with about 750 Angstrom and the method to make them. Since the present claims are also directed to a microscopic battery integratable with a microelectronic circuit, it would be capable of being integrated with a microelectronic circuit.

Arledge et al disclose electrical energy storage device according to the foregoing. However, Arledge et al do not explicitly disclose the integrated battery with a microelectronic circuit and the specific power output.

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to integrate the microscopic battery with a microelectronic circuit as Arledge et al teaches that microelectronic circuits are made with same thin films, method and characteristics used to product the microscopic thick electrodes. In this regard, this thin film technology is known to those skilled in the art and therefore it would be obvious to have thin film electrodes integrated with a microelectronic circuit deposited on substrate that are held in close proximity and have the capability of producing devices that have very high capacitance per unit volume. This provide a competitive advantage over the conventional art by creating an energy storage device that can store more energy and provide more specific power in a smaller, less complex package than other technologies. Premised on Arledge et al's disclosures, it would be obvious to a skilled artisan to recognize that the dimension of the battery itself is thus totally commensurate to the dimension of the microcuircuit or microelectromechanical system, or vice-versa

10. Claims 10-12 and 15-43, 51-54, 89-92, 94-97 and 103-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shokoohi et al 5110696.

Shokoohi et al disclose a rechargeable thin film intercalation electrode battery having a thin film electrode. The battery is assembled directly upon semiconductor devices and integrated circuitry (abstract). It is disclosed that the produced crystalline grain sizes generally larger than about one micrometer which is related to the electrode surface area in typical 0.5 to 1.5 micrometer thin films (col 2, lines 12-17). The thin film electrode for secondary batteries is made under conditions that are compatible with microelectronics technology (col 2, lines 19-24).The thin film layer is deposited by reactive electrode beam evaporation onto a suitable substrate from a bulk source of the oxide compound; it is obtained a 0.05 to 0.1 micrometer grain size (col 2, lines 30-36/ col 2, lines 50-51). The crystalline substrate is coated with the thin film layer in any evaporative or sputtering technique to provide such a buffer layer upon which the electrode compound condenses during the evaporative coating operation (col 2, lines 41-45/col 4, lines 55-59). It is disclosed a substrate of about 10 mm diameter (col 5, lines 50-55).

Shokoohi et al disclose an electrode structure consisting essentially of a substrate, an inert buffer layer , and thin film layer of the active compound (col 4, lines 26-30). The substrate could comprise GaAs, Si or other semiconductor device material, in ultimate use with integrated microelectronic circuitry (col 4, lines 39-42). The insulating layer and a metallic buffer layer are also disclosed (col 4, lines 42-47). A thin film layer of about 10 nm is useful to ensure effective bonding (col 4, lines 52-54).

Shokoohi et al teach that substrate does not react with the electrode compound due to the use of influential substrates such as quartz, s/s, or aluminum. Also, it is disclosed the masking of physical imperfections that might nucleate larger crystal growth (col 2, lines 52-59). *Masking as etching produces or adjust patterns or designs on the surface of the electrode substrate.* The method of electrode preparation is disclosed (col 2, lines 60-68) including the deposition of film on the substrate until the desired film thickness (col 3, lines 10-12). The electrolyte as well as the anode elements are taught; also the method may be employed for anodes (col 3, lines 24-30/col 3, lines 52-55). By using this method, the electrode compounds may be used in integration of power supplies with microelectronic circuitry (col 4, lines 1-5).

Shokoohi et al further teach that the cell comprises a body fitting in which are assembled insulating material and the active cell elements consisting of the cathode, the anode and the intermediate separator of glass cloth (non-metallic) and a solution (col 6, lines 41-56). It is further disclosed the cell performance was tested over series of charge/discharge cycles at varying current densities as shown in Figure 3 (col 6, line 58 to col 7, line 10).

Shokoohi et al disclose a battery according to the aforementioned aspects. However, Shokoohi et al do not explicitly disclose the footprint area and the specific power output.

In view of this disclosure, it would be obvious to make a battery having an area on a surface covered (footprint area) by the cell assembly of less than 20 cm^2 as Shokoohi et al teaches that in a fabrication of an exemplary film electrode the diameter of the substrate is about 10 mm which is approximately equivalent to an area of 0.785 cm^2. Since the anode may be substantially

the same in size as the cathode; the electrodes gap is commensurate to the electrode size and the body fitting in which the components are assembled simply provides a suitable enclosure for the cell, the size of the cell is substantially less than 20 cm^2. Accordingly, the volume required to store the energy is determined by the specific power requirements of the cell. However, if the cells are made of sufficient size, enough energy can be stored to produce a specific charge, energy and/or power output.

11. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arledge et al 5437941 as applied to claim 10 above, and further in view of Wrighton et al 4717673.

Arledge et al is applied and incorporated herein for the reasons above. In addition, Arledge et al do not disclose the sensor system.

Wrighton et al disclose a polymer based electrochemical device which functions as a sensitive sensor which measures changes in chemical concentration or pH (col 1, lines 32-35); the polymer based microelectronic device amplify very small electrical or chemical signals (col 1, lines 36-39). The device can be incorporated into microelectronic systems and conventional integrated circuitry which are responsive to electrical input (col 1, lines 49-51). The device is useful as car battery (col 2, lines 41-43).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to integrate the sensor system of Wrighton et al in the energy storage device of Arledge et al as Wrighton et al disclose that the device can be incorporated into

microelectronic systems and conventional integrated circuitry which are responsive to electrical input. Thus, the microelectronic device may provide very high resolution, stability and rapid response of battery conditions such as changes in chemical concentration e.g. pH, hydrogen, oxygen, and other chemicals.

Response to Arguments

12. Applicant's arguments filed 01/11/01 have been fully considered but they are not persuasive. The contention of applicant arguments' is based on the reasons set forth by the applicant in declarations filed 08/18/00 and 12/15/00. Hence, the declarations have also been fully considered, however they are not convincing so as to overcome the rejection over Arledge et al. The declaration presents many reasons regarding the capacitive behavior of energy storage devices, integratable microcircuits and whether or not the disclosure of Arledge et al enables fabrication of batteries; and cell sizes and capacities.

The assertion that the prior art enables only capacitor and does not relate to microscopic sized batteries or does not pertain to batteries is not sufficient to overcome the rejection. **First, it is pointed out that the '941 patent clearly disclose/teach/enable *electrochemical cells (col 1, lines 8-10)*. Moreover, the reference teaches that while the behavior exhibited with these examples is capacitive in nature, by employing different electrode materials, *an electrochemical cell, such as a battery can be created (col 5, lines 35-45).*** Thus, a skilled artisan would recognize that the battery of the prior art must also be used similarly to the microscopic

battery of the instant claims. Furthermore, even though the reference do not explicitly state the use of a microscopic battery, it is an implicit teaching. In that, the battery of the prior art may be made as the microscopic battery of the instant claims. In this regard, a reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill might reasonably infer from the teachings. Also, it is not necessary that the prior art suggest espressly or in so many words, the changes or possible improvements the invention intends. It is only necessary that the reference apply the general knowledge clearly present in the prior art.

As to the footprint area, it is noted that both references disclose batteries comprising microcomponents and microcircuitry, since the size of the electrode elements are commensurate to the battery size and the body fitting in which the components are assembled simply provides a suitable enclosure for the cell, the size of the cell is somewhat equal in measure or extent of the components so as to correspond in size, or structural proportion. Thus, the skilled artisan would recognize that the dimension of the battery itself is thus totally commensurate to the dimension of the microcomponents placed inside the battery.

In response to applicant's argument that reference enables only capacitors and it briefly mentions batteries, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant's arguments do not comply with 37 CFR 1.111© because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached from Monday- Thursday from 8:00 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gabrille Brouillette, can be reached at (703) 308-0756.

In order to transmit an unofficial fax, the number is (703) 306-3429. In order to transmit an official fax/amendments after final, the number is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

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